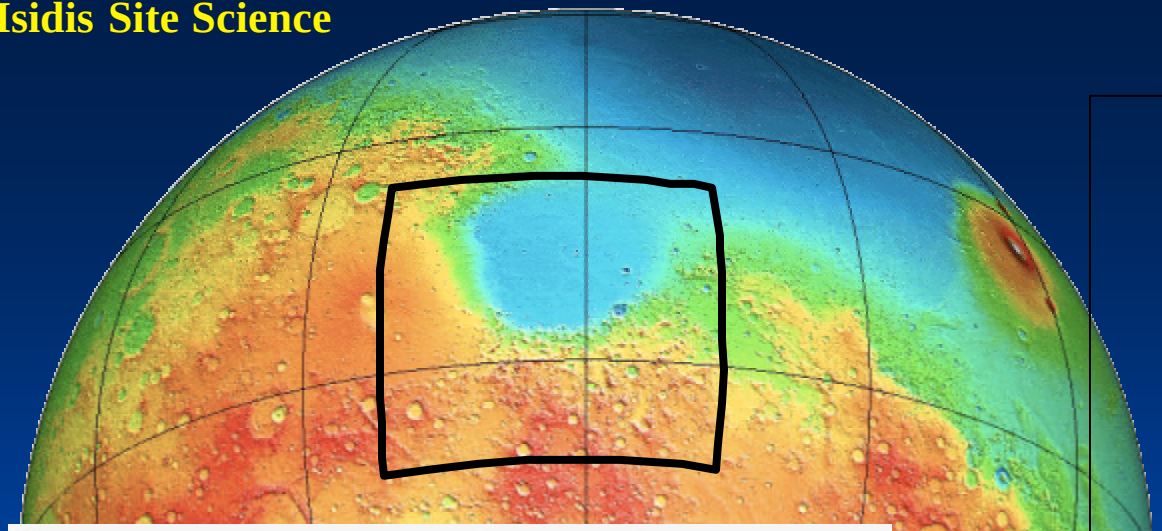
# 3rd MER Landing Site Meeting

- Eastern Isidis-Libya montes transition target
- Presentation by L. Crumpler

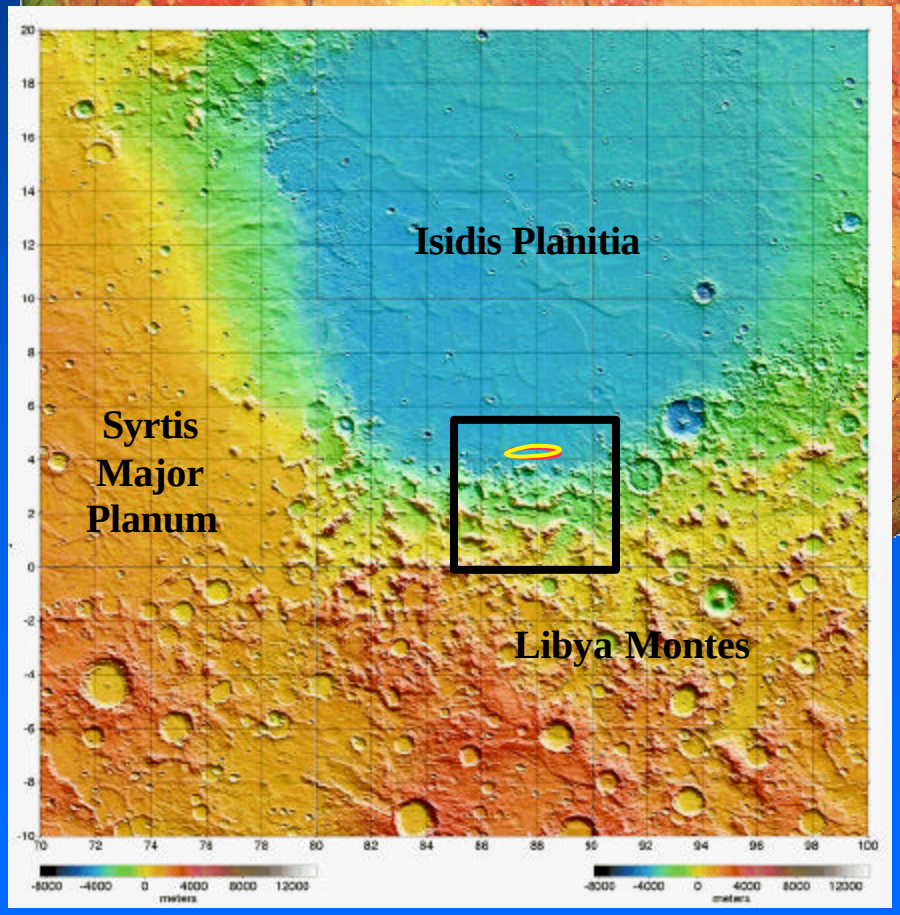
NOTE: This is version 1.0. Following revisions, version 2.0 will be uploaded on Saturday, March 23, 2002



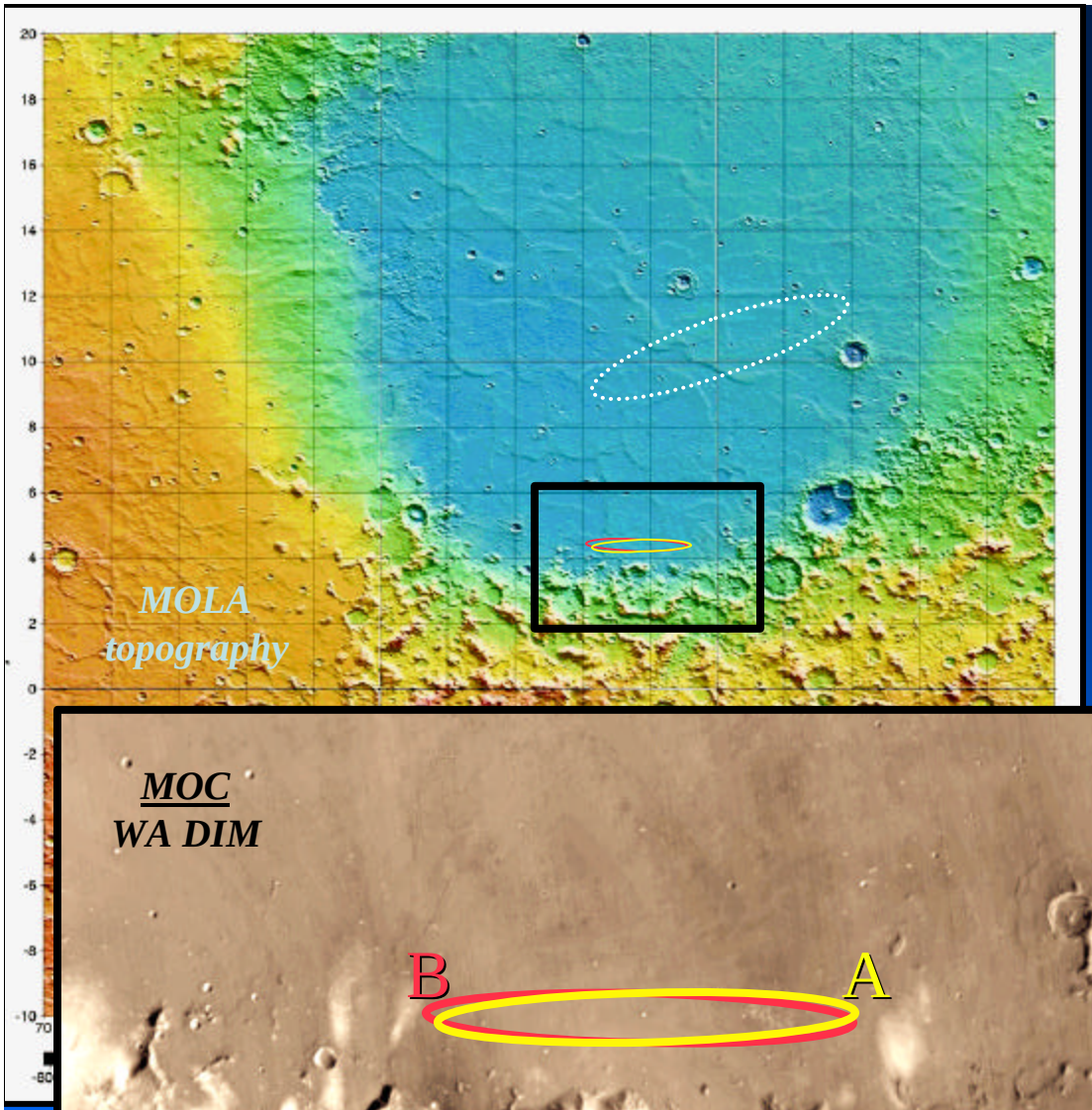
# Isidis

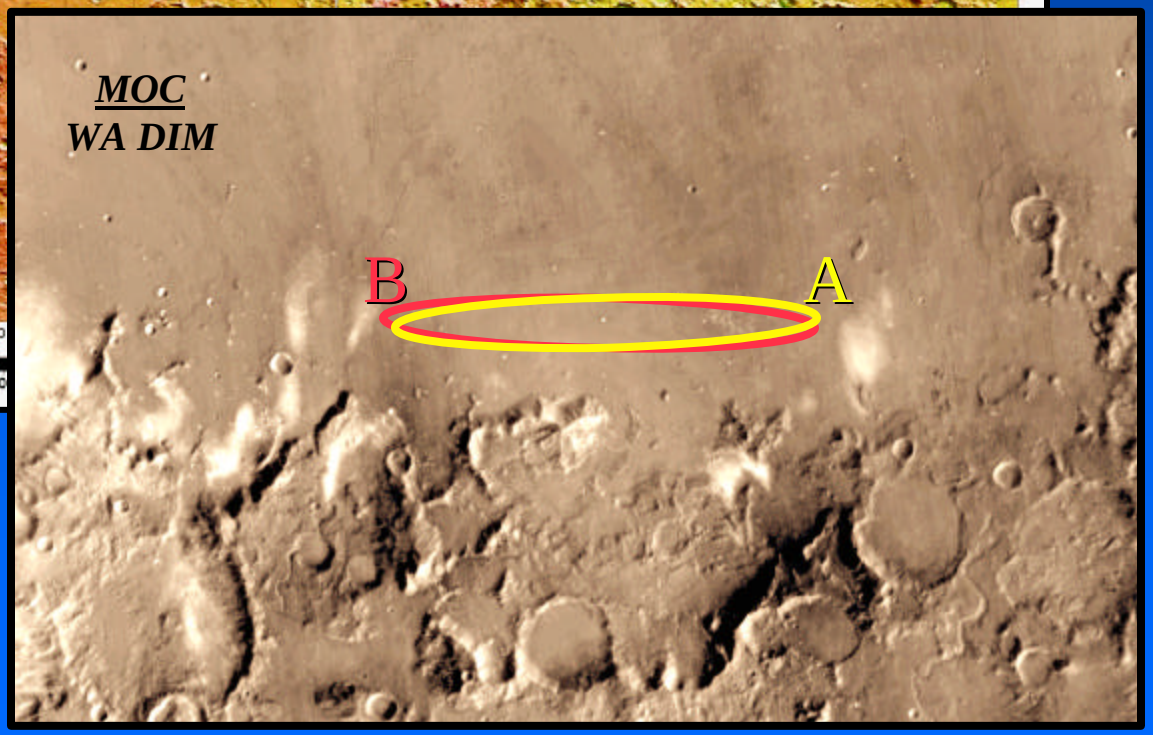
L. Crumpler

•Contributions from:
•Tanaka, Hare, Newsom, Golombek,




## IP 96B & IP 84 A
## MER
## Target Ellipses




# Isidis Site: Significance?

- sediment fans from nearby highlands
- the most ancient highland material
  - valley networks
  - paleolakes
  - long fluvial history
  - safe

# *So What?*

## *Why are the oldest rocks of interest?*

Mission goal is "…… to determine the history of climate and water at a site on Mars where conditions may once have been favorable to life."

**key words:** • "ancient water" • " past climate" ⇨ • ancient rocks • altered rocks

## Significance of Sediment Fans

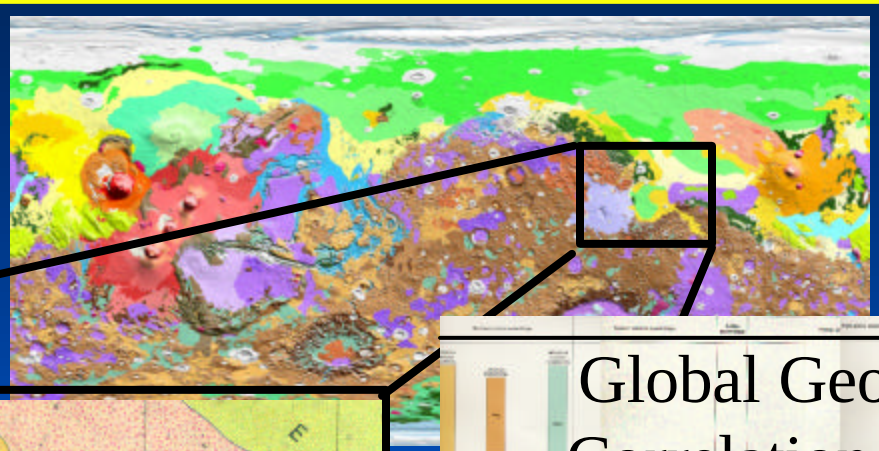
- **collection of weathered materials**
- **preservation of ancient information**

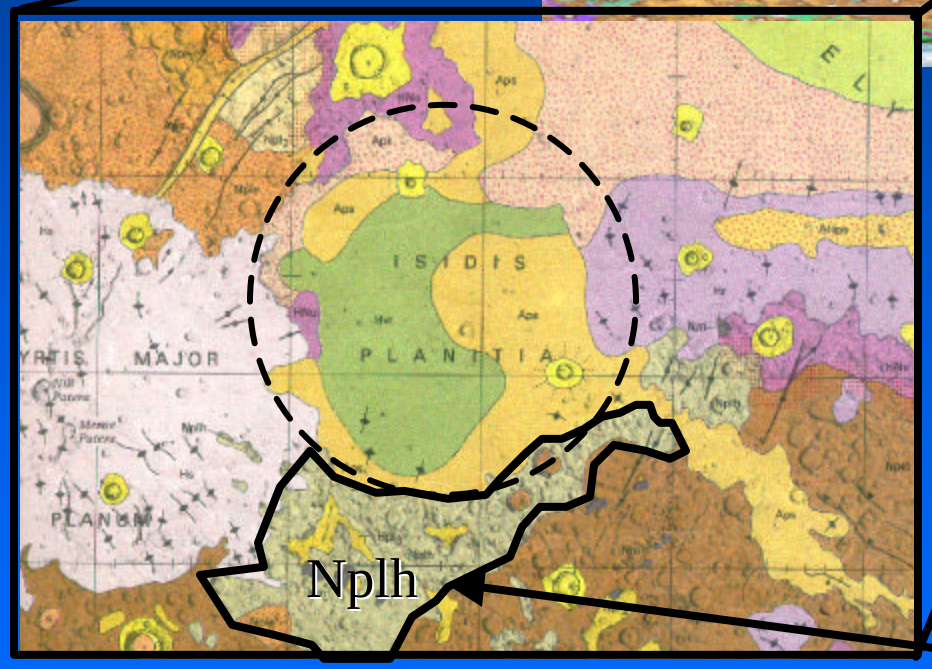
## Significance of Oldest Highland Rocks

- **witnessed and recorded climatic events**

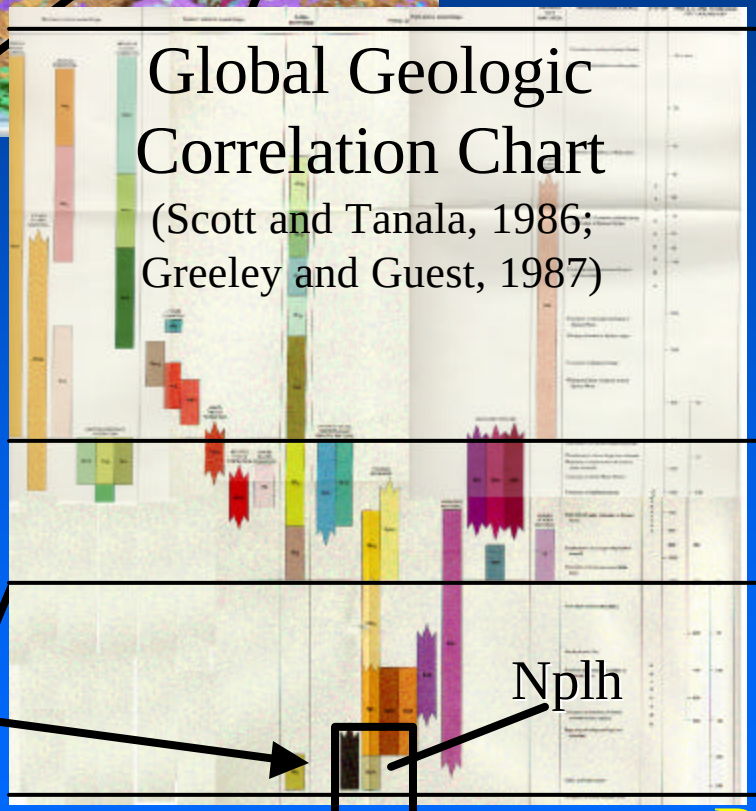
# *Source for Isidis sediments: the oldest terrain on Mars*

Global Geology





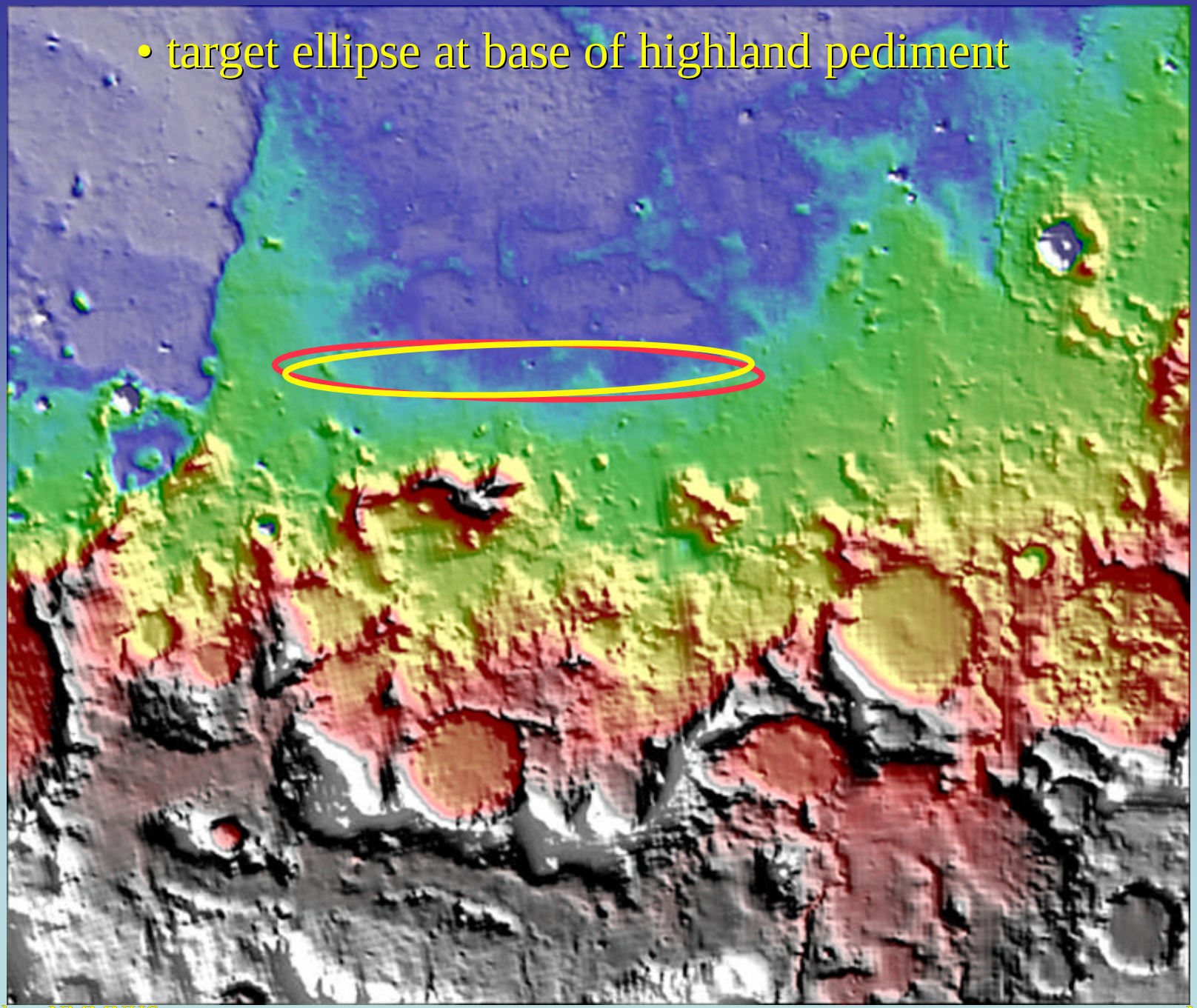

Syrtis-Isidis regional geology



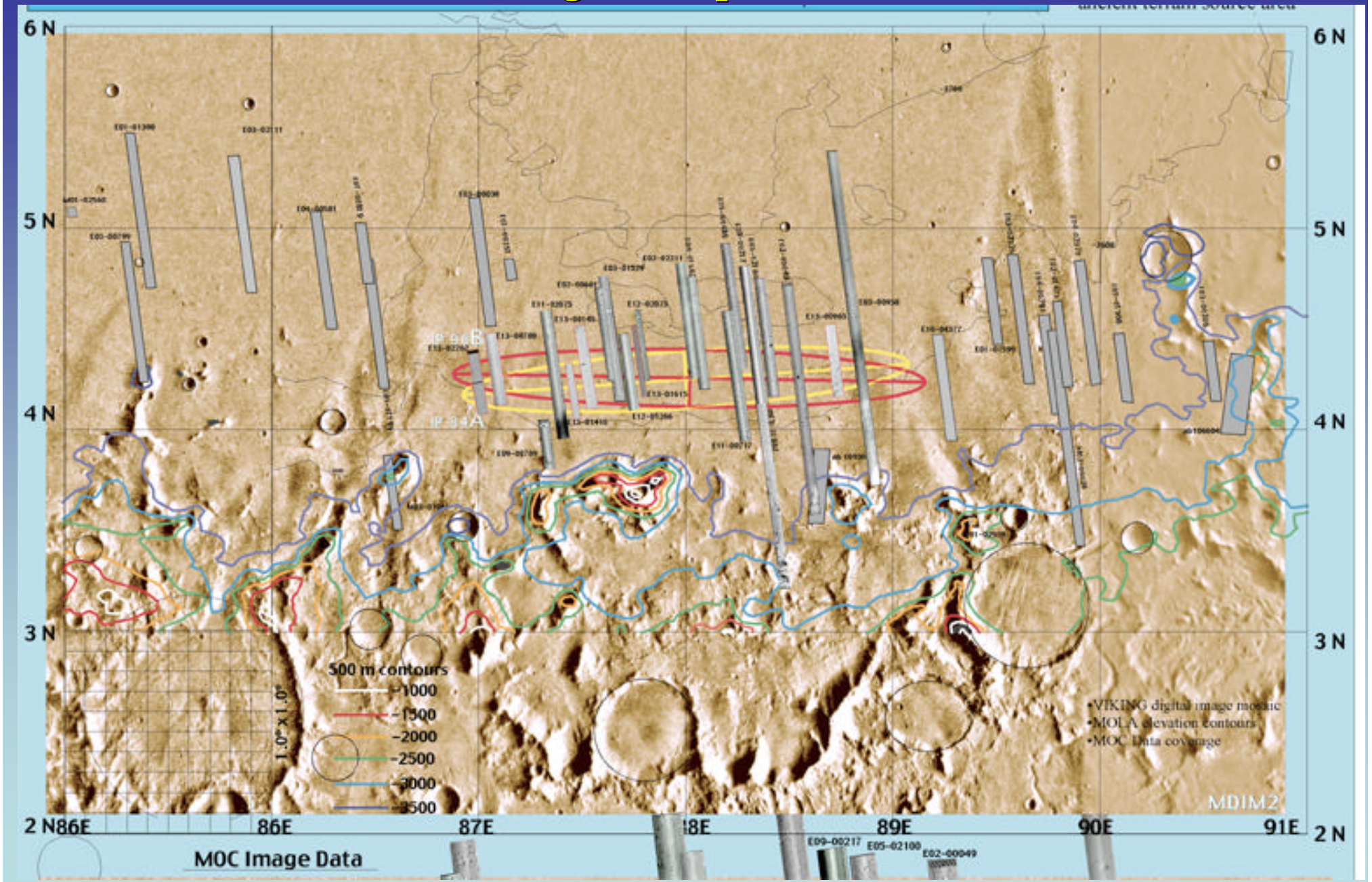

**• at bottom of stratigraphic column**

# *MOLA DTM - Eastern Isidis*

- target ellipse at base of highland pediment



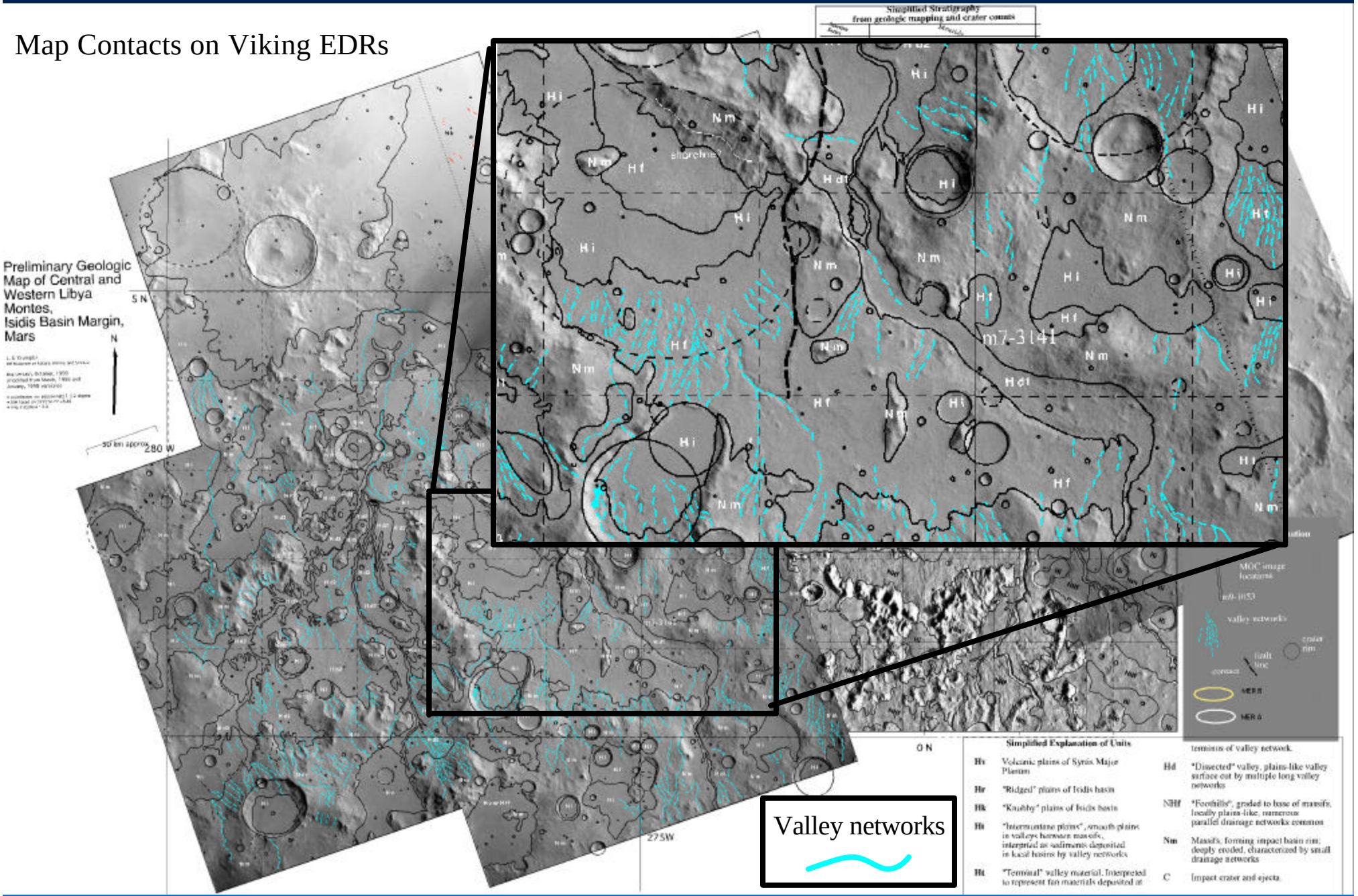
# *Eastern Isidis: Target Ellipses, MOC on MDIM*



# *Example of the abundance of valley networks*



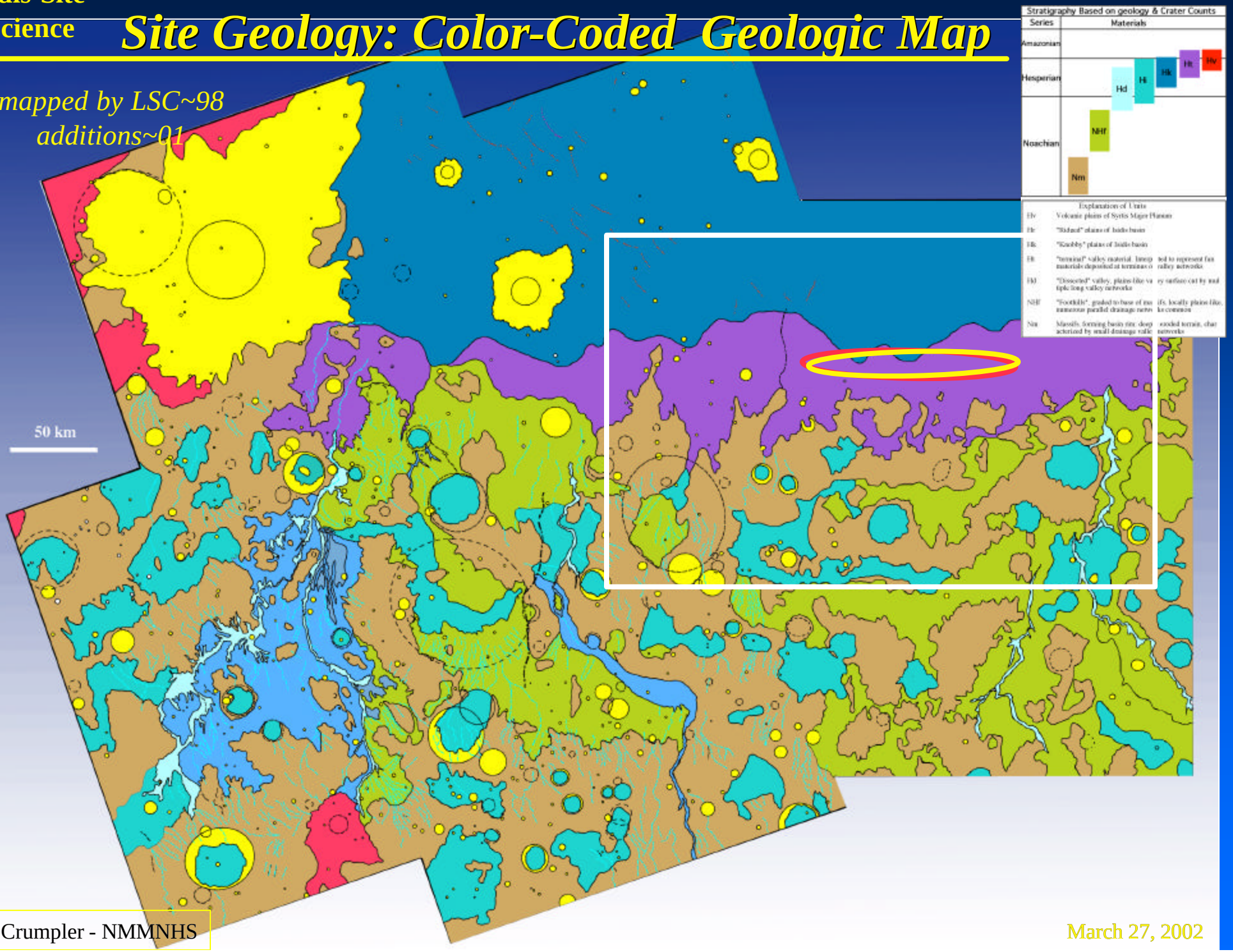
Map Contacts on Viking EDRs



Isidis Site Science

# Site Geology: Color-Coded Geologic Map

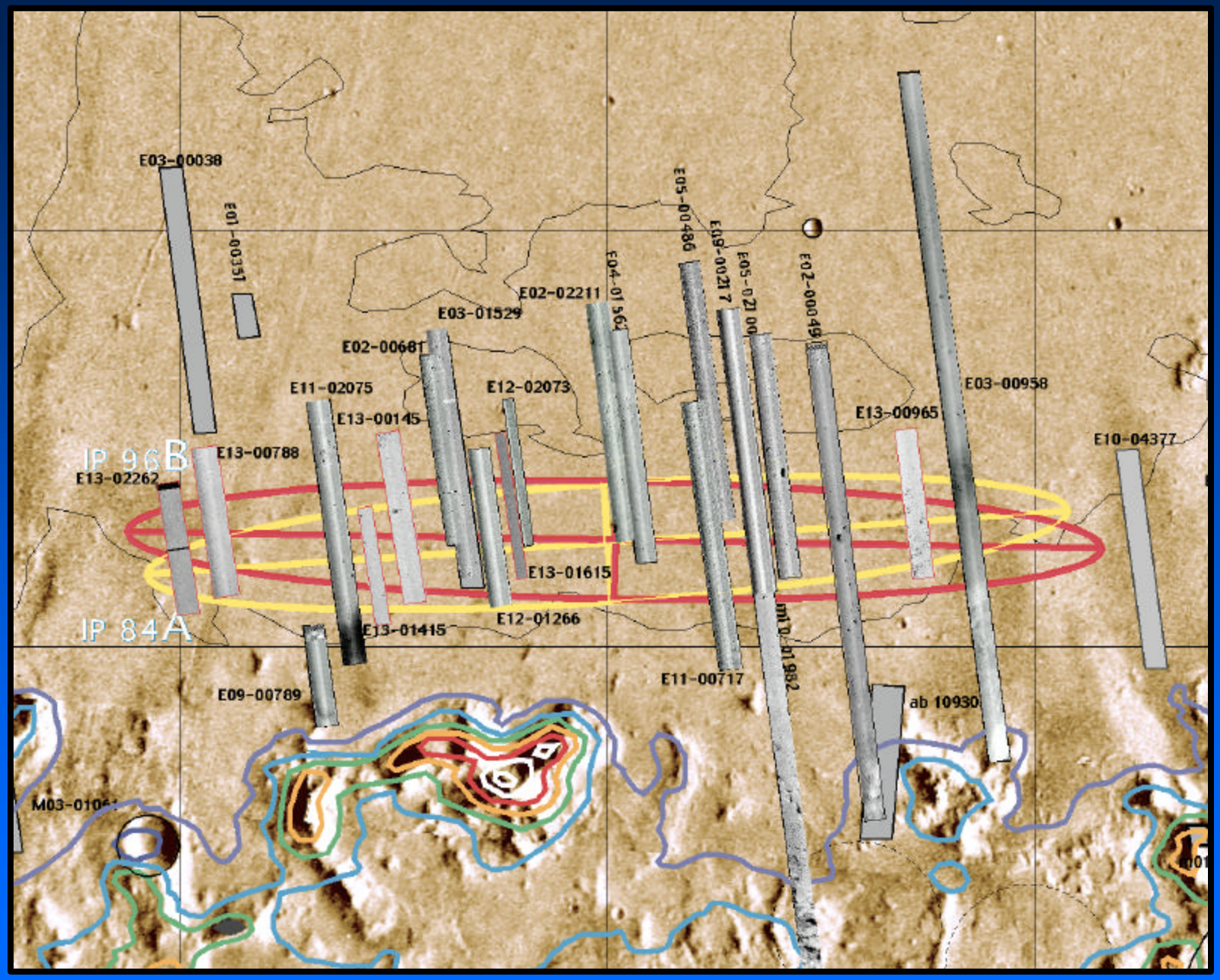
*mapped by LSC~98*
*additions~01*



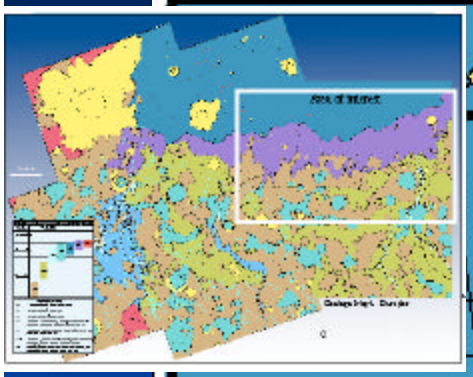

L. Crumpler - NMMNHS

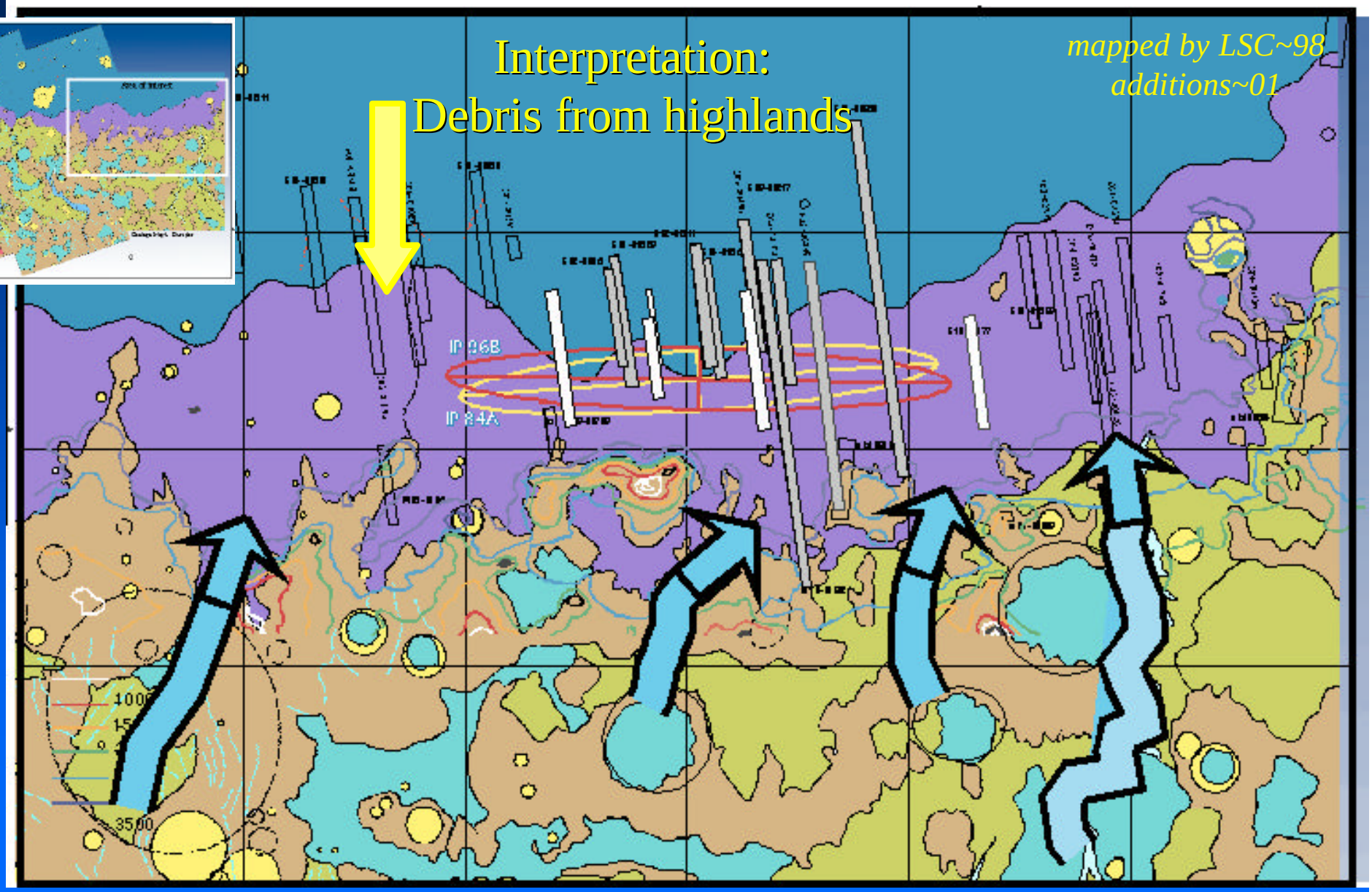
March 27, 2002

# Target Ellipses & MOC on MDIM

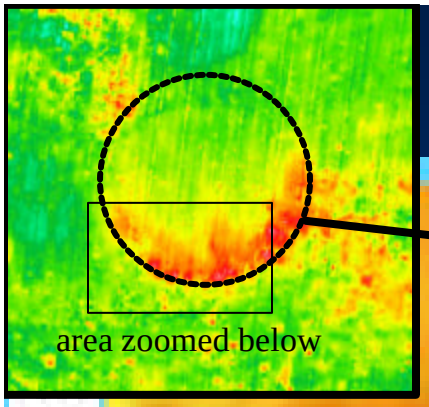


# Isidis Geology in Target Area



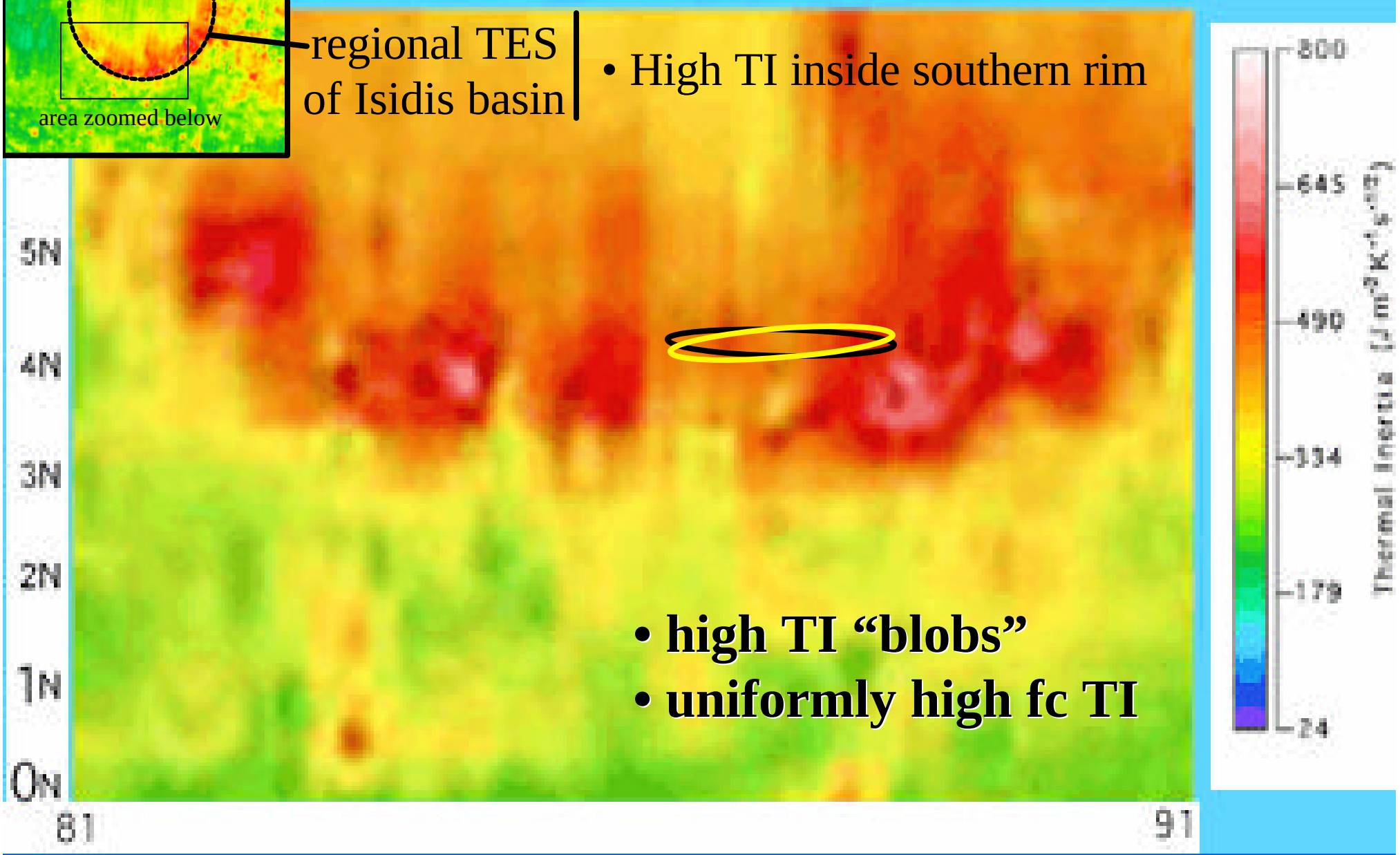


# *TES Thermal Inertia*




regional TES of Isidis basin

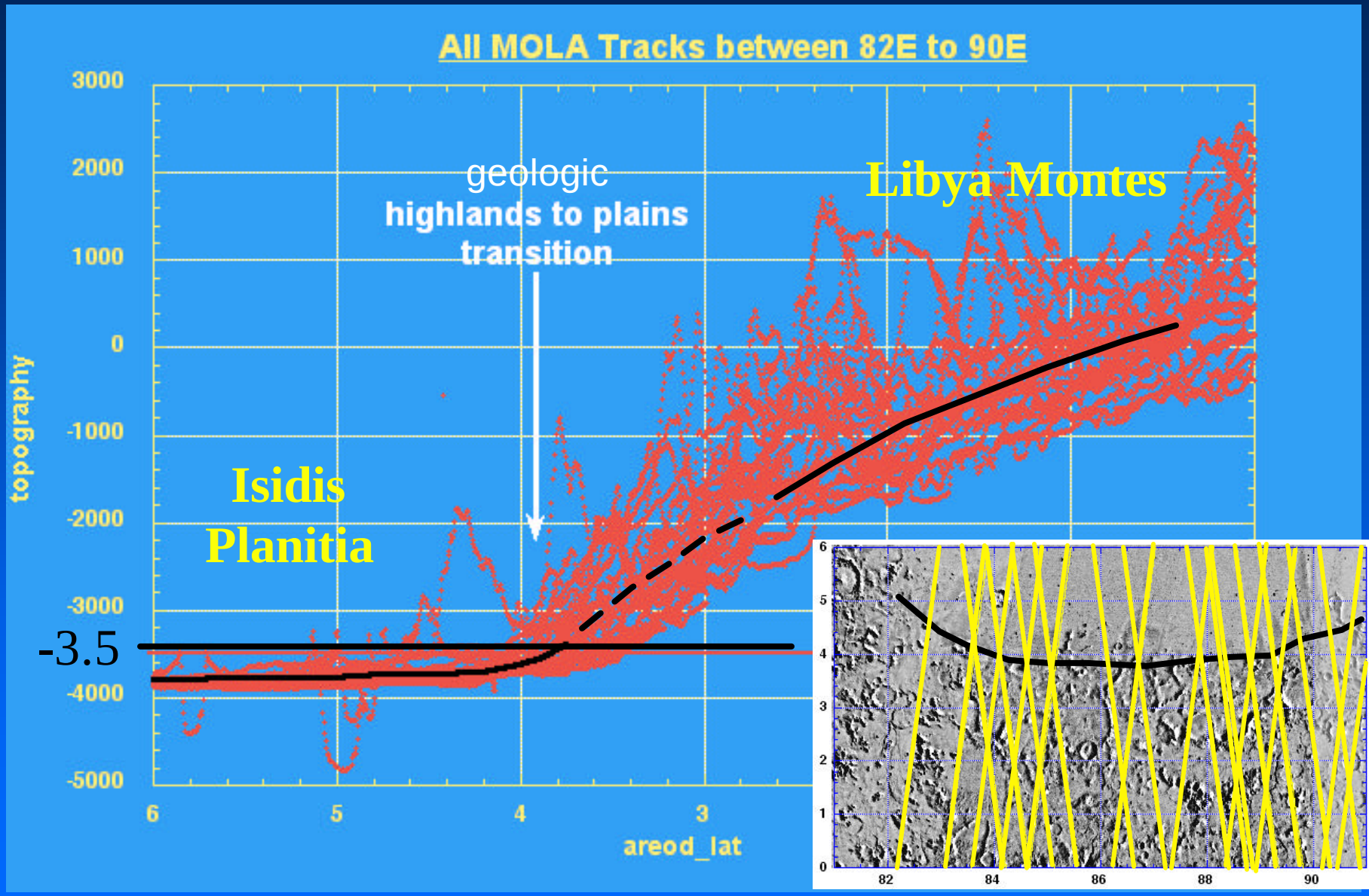
- High TI inside southern rim



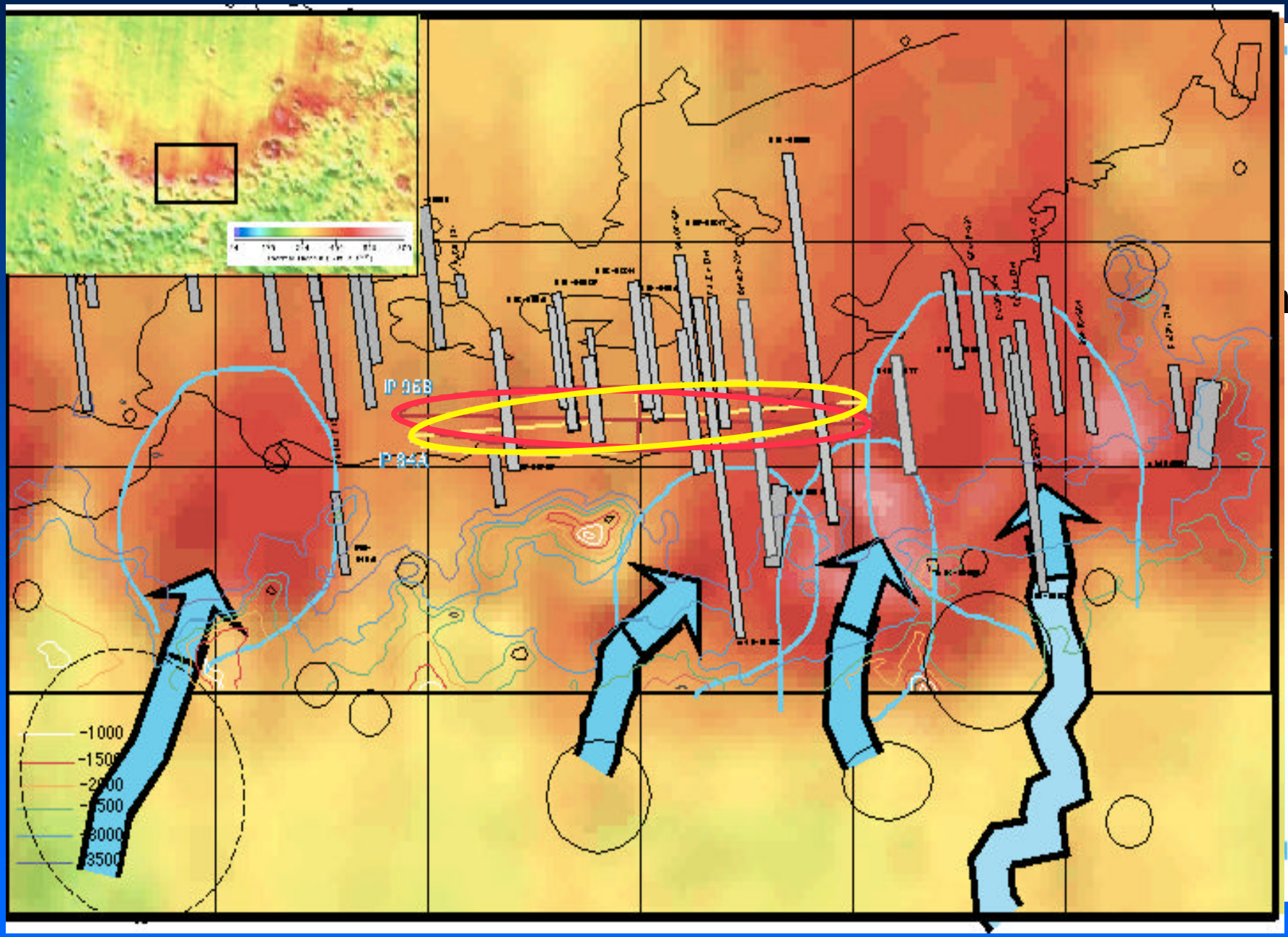

- **high TI “blobs”**
- **uniformly high fc TI**

# MOLA Data Tracks Across Isidis-Libya Transition

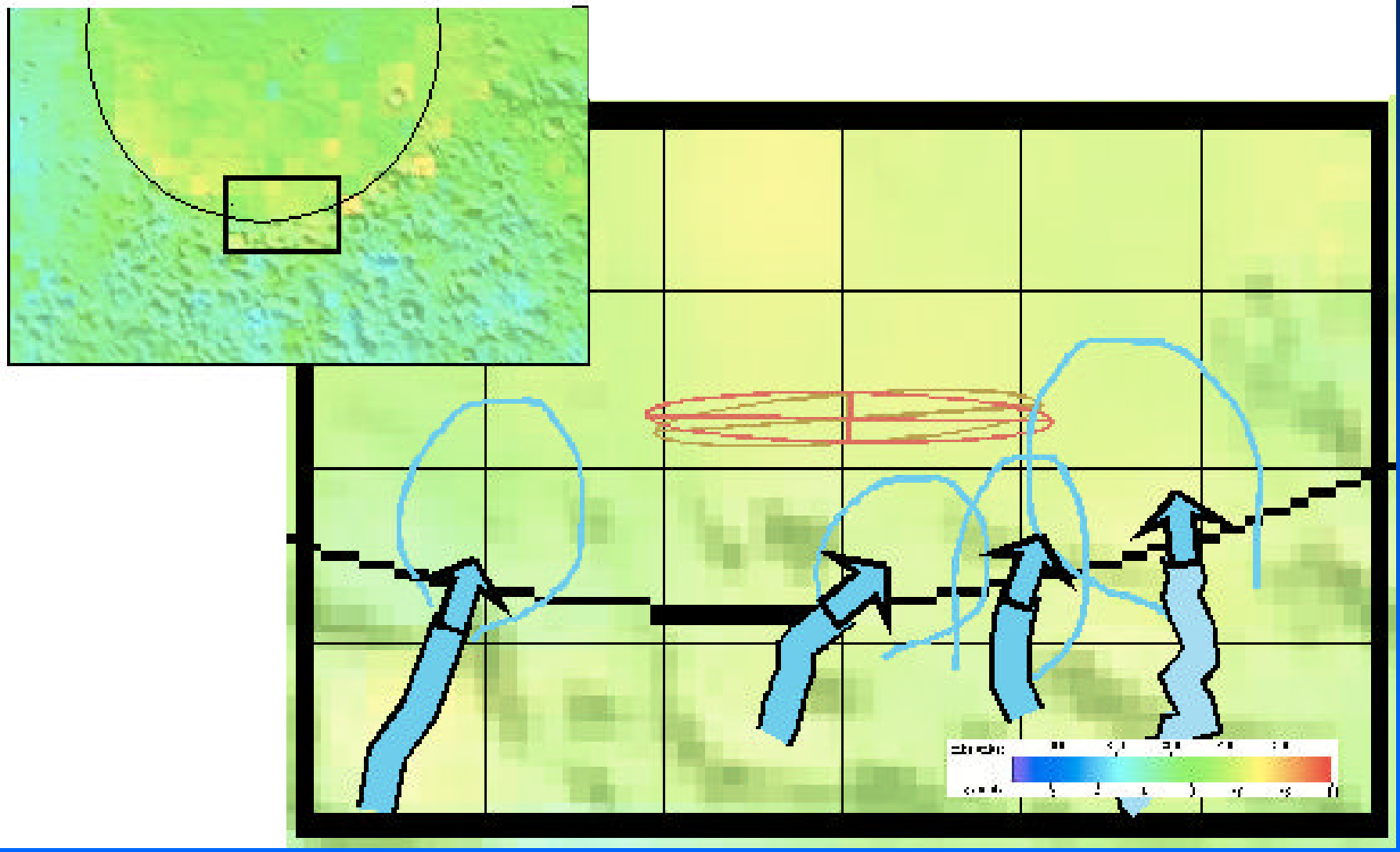




# Geolines on TES Thermal Inertia



# IRTM FC



# *Summary of Isidis Surface Properties*

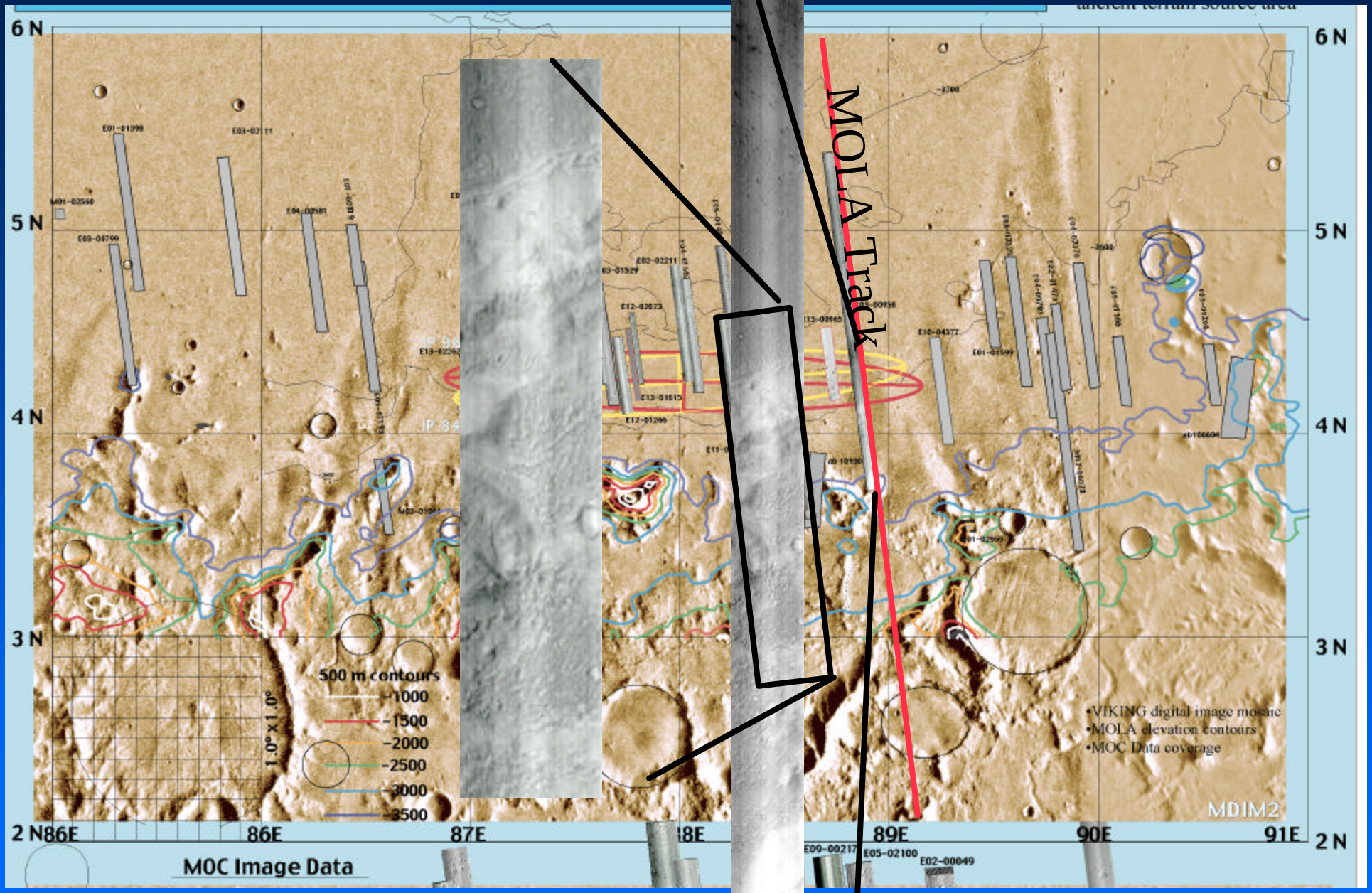
- **High Thermal Inertia**
- **High Fine Component Thermal Inertia**
- **Moderate Albedo**
- **High Rock Abundance & Fines**
- **[High Red/Blue Ratio, (to N)]**

"…..thermal inertia, albedo, rock abundance and fine component ……"[*can be interpreted as representing a*]"….. surface [that] has little dust, but a weathered duricrust surface that is bright (red).. [*an example would be*].. a cemented mud flat with rocks."-*Golombek*

• Rocky Sites with Possibly Weathered Crusty Surface

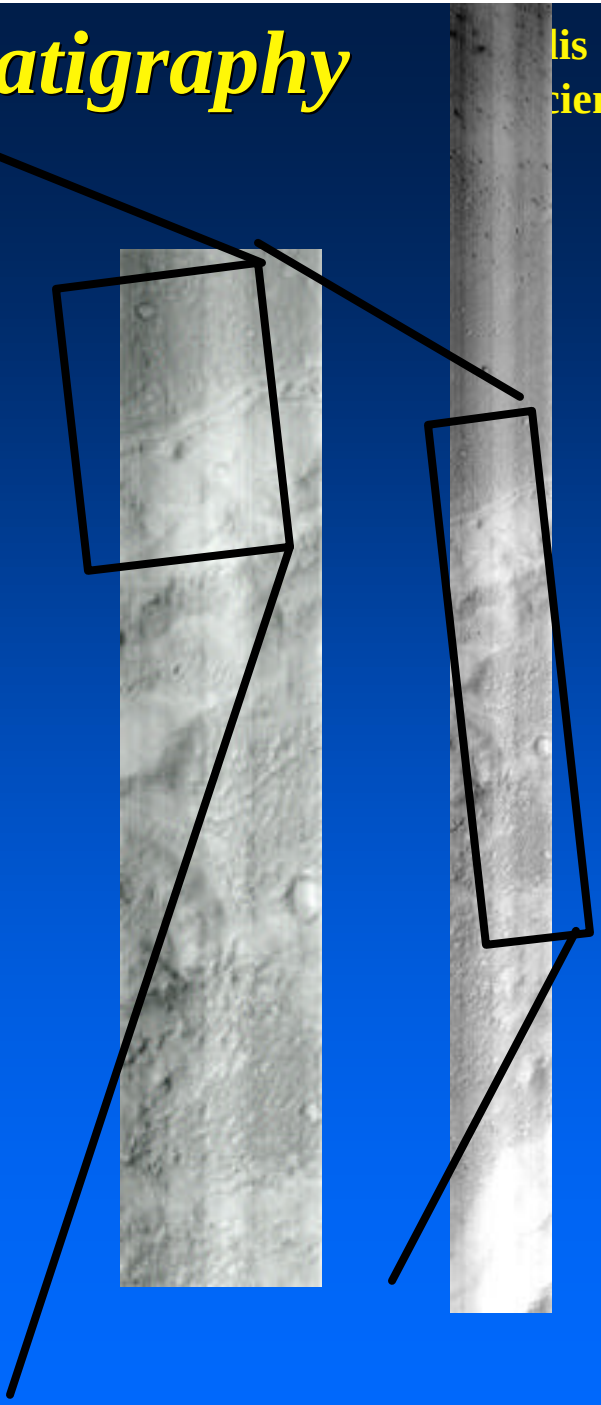
# Isidis-Libya Transition Stratigraphy

Isidis Site Science



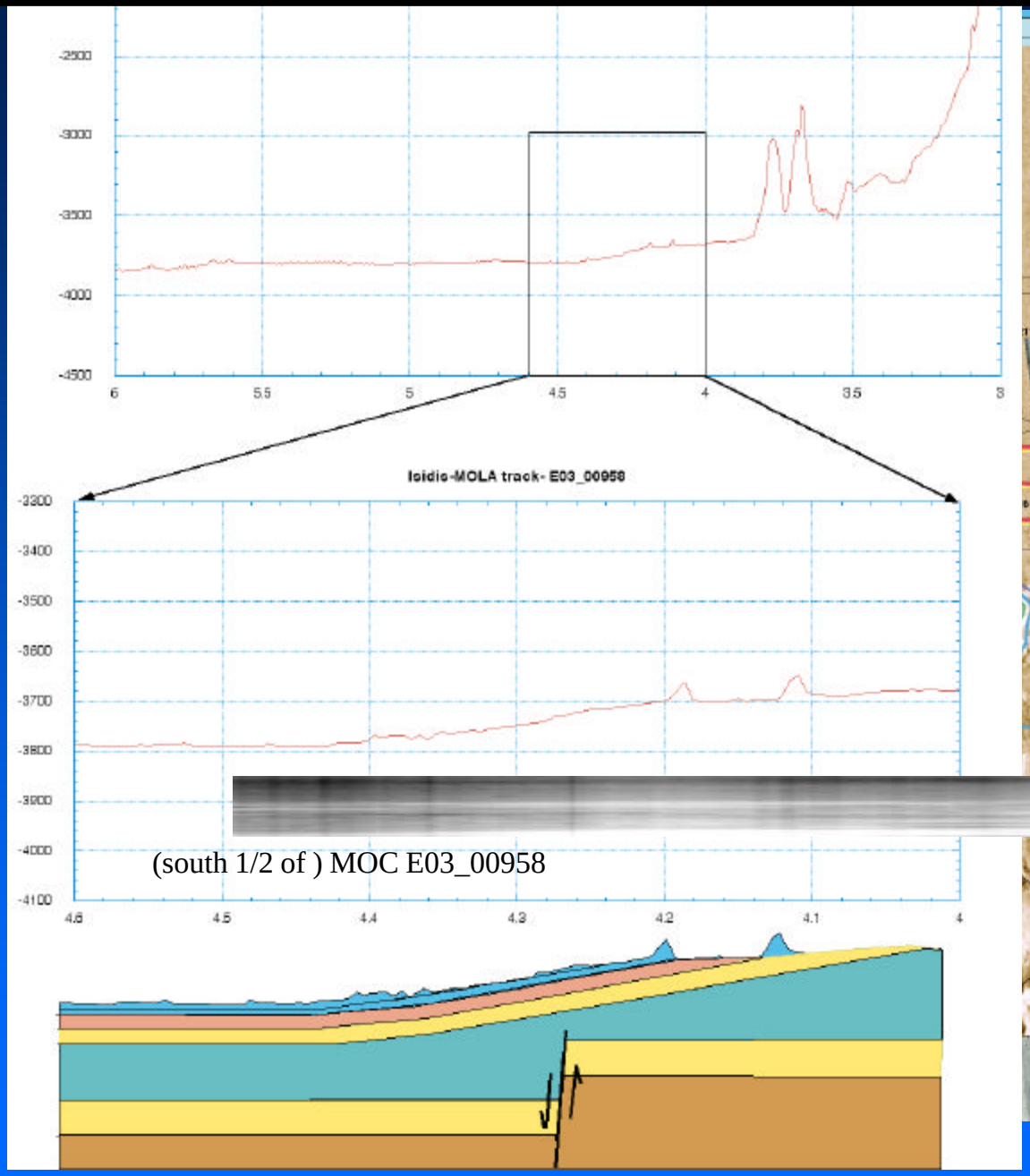
# *Isidis-Libya Transition Stratigraphy*

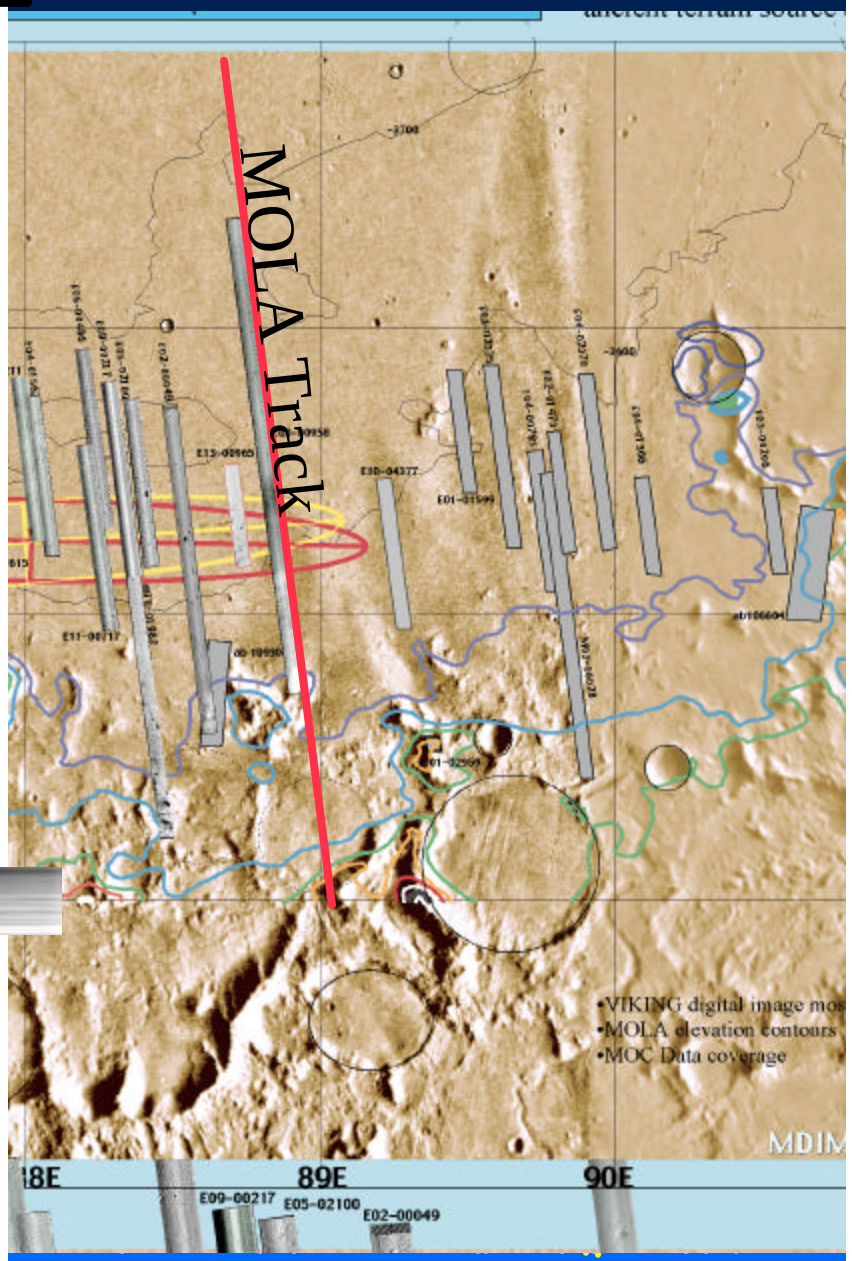


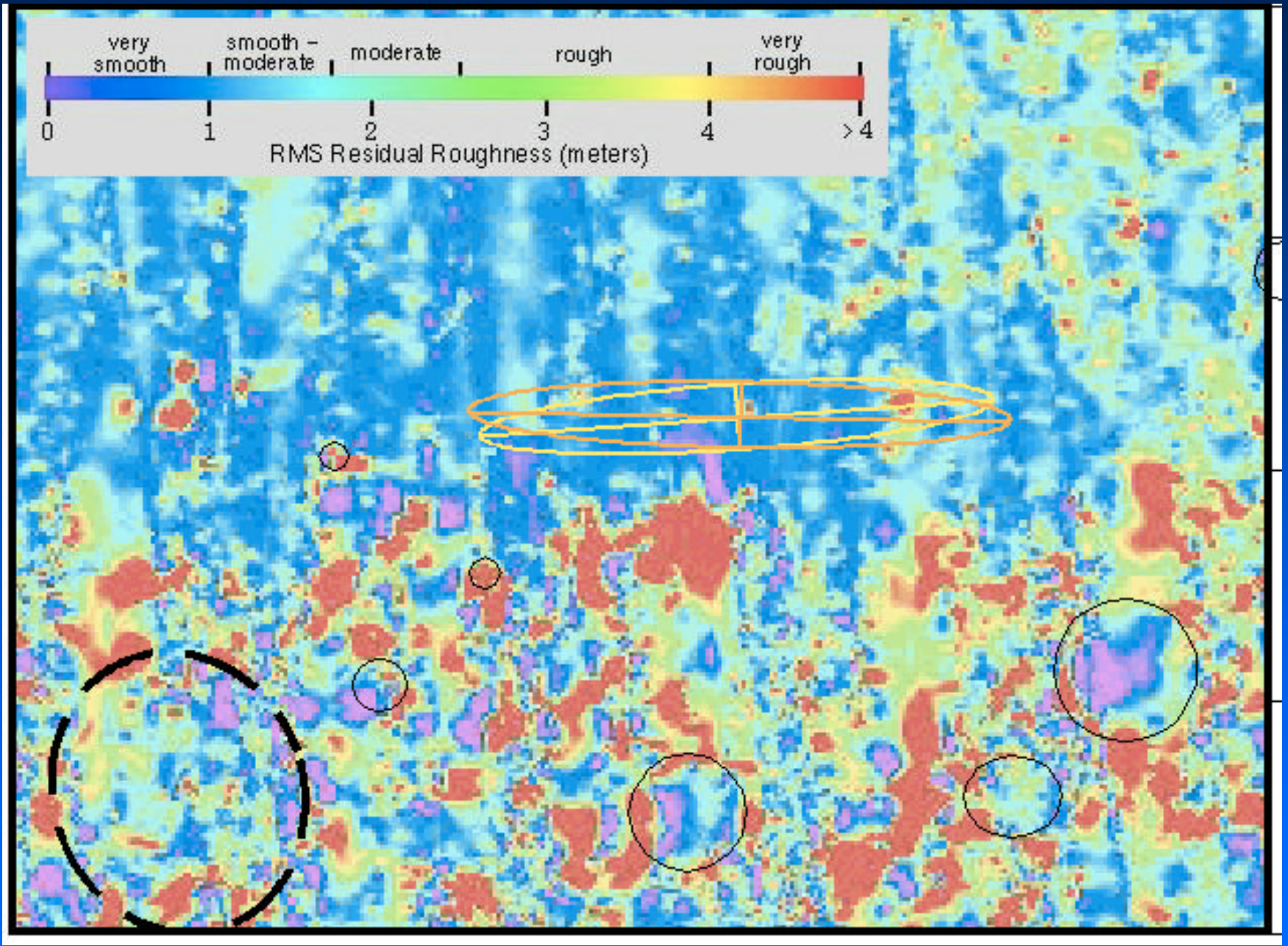
# *Structure across Isidis-Libya Transition?*



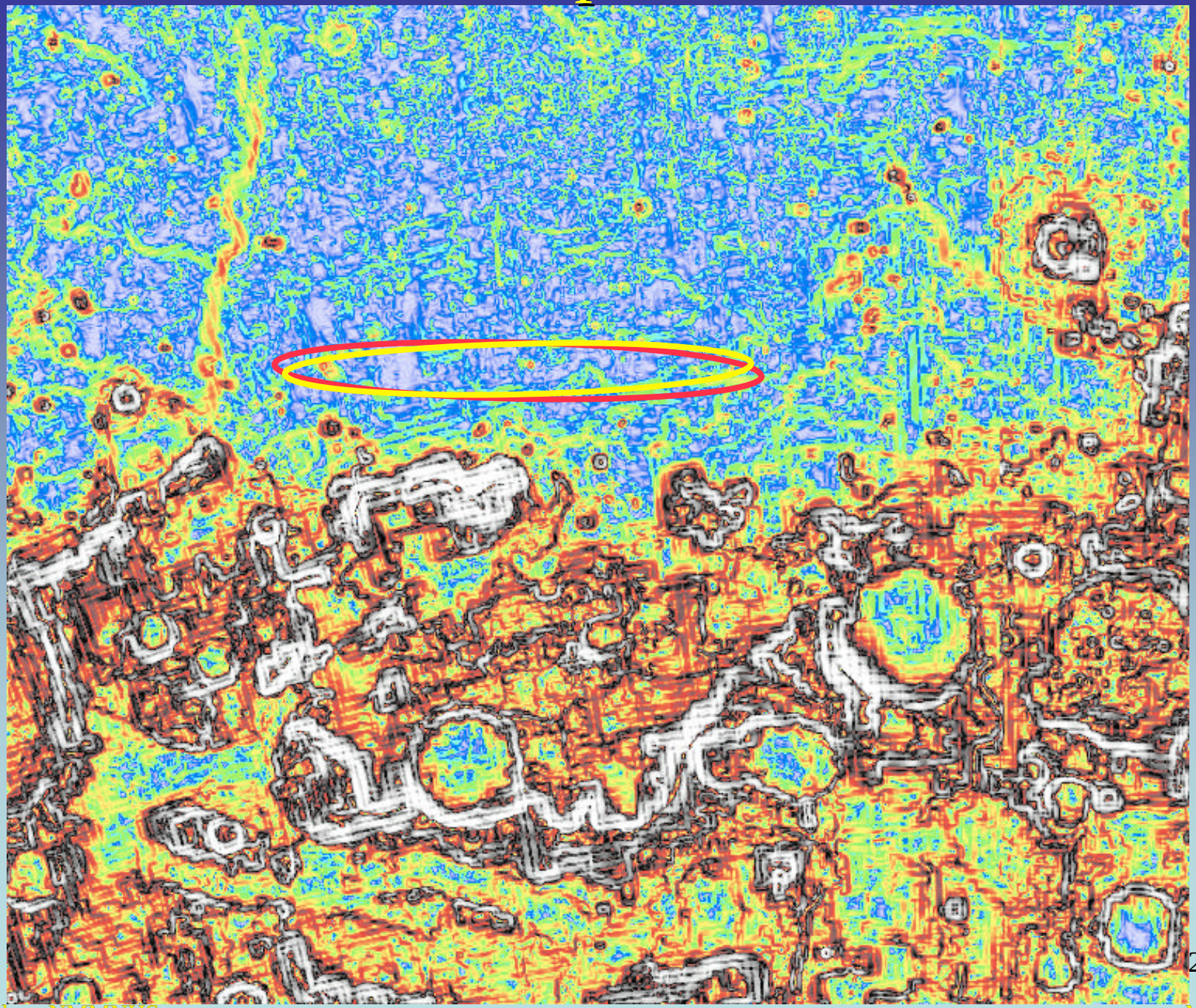


# MOLA vertical roughness

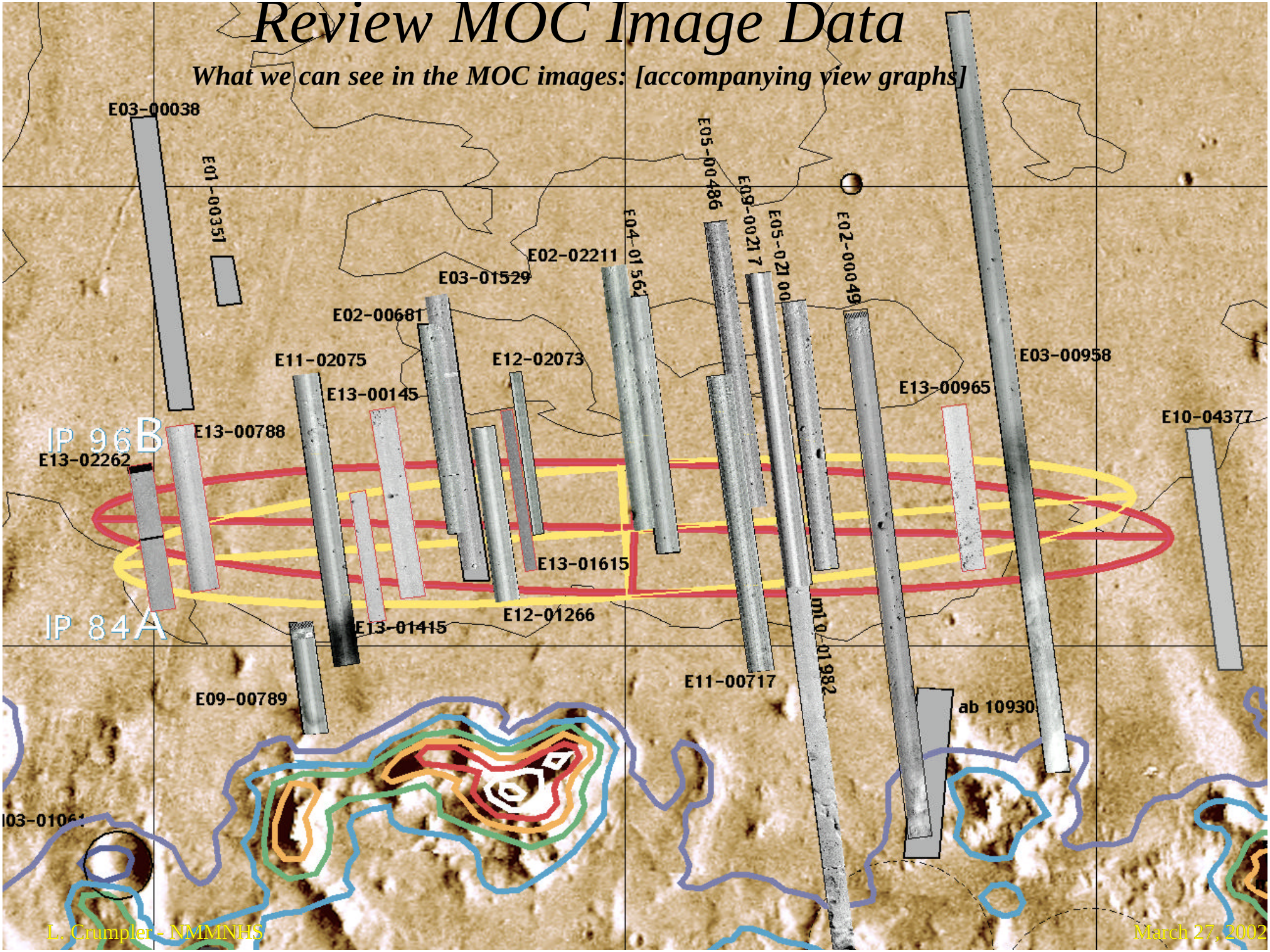


# *Mola Slopes -Isidis*



# *Review MOC Image Data*

***What we can see in the MOC images: [accompanying view graphs]***



# Additional MOC Image Examples via Viewgraph

The surface as revealed by MOC Data

- E03_00958
- E05_2100
- E04_01562
- E02_00681E02_00049
- & others

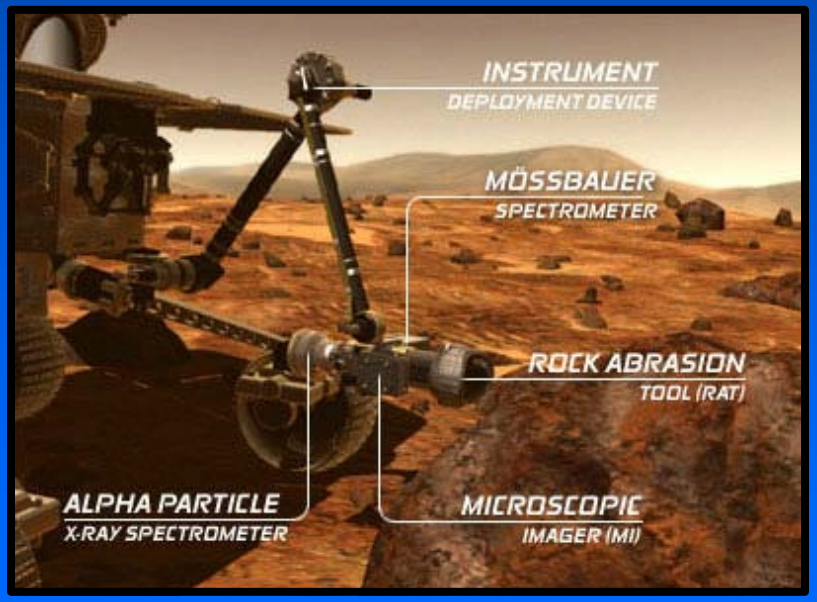
# *Summary of Isidis Geologic Properties*

- Sediment fans
  - low energy environment (not catastrophic floods)
- Fines and rocks
  - Re-worked sediments from
    - previous deposition/paleolakes
    - highland rocks and fines
    - deep substrate mafic rocks
- weathered highland materials

# *Summary of Isidis Geologic Properties*

- "…..long-lived fluvial system representing multiple wetting and drying episodes carrying sediments from early paleolakes, highland massifs, and local volcanic rocks."
- semi-mature fluvial system from earliest Martian geologic history through late Hesperian

# *Athena Science Potential at Isidis*


PANCAM

MINI-TES

MÖSSBAUER
- diverse ferric/ferrous
- diverse weathering

RAT
- abundant rocks
- Noachian weathering

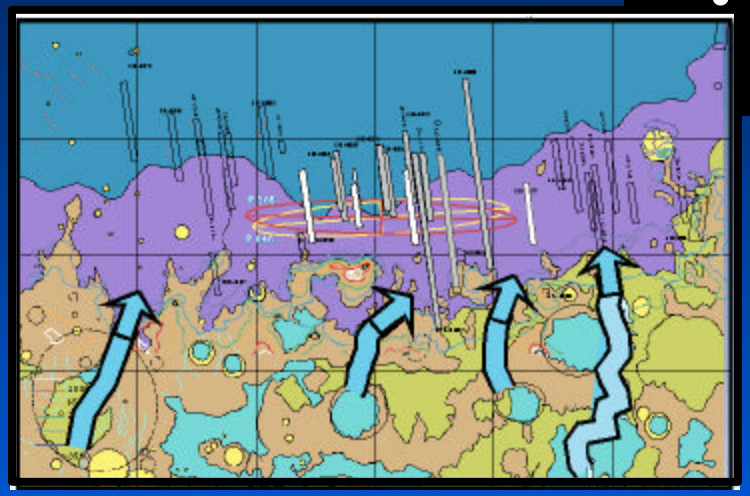
APXS
- rocks
- sample diversity
- sediments?

Microscopic imager

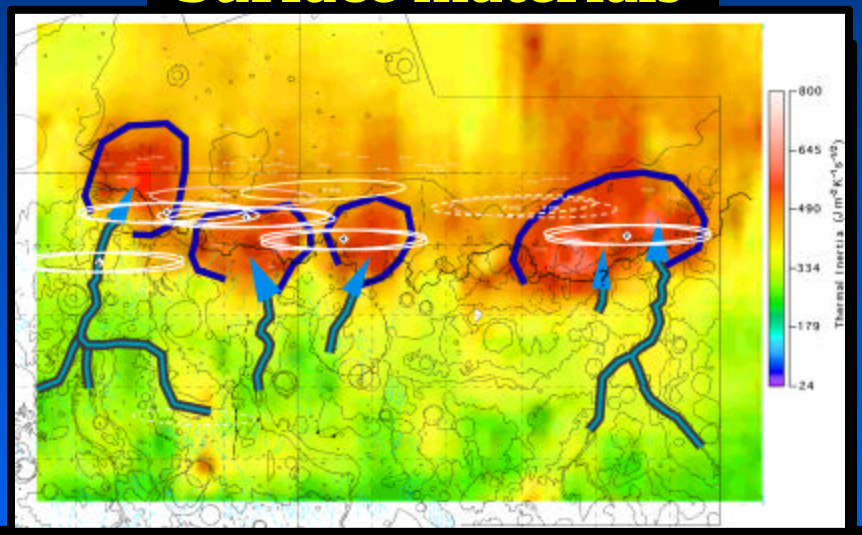
# *Summary of Isidis Target Sites*

## Site Geology

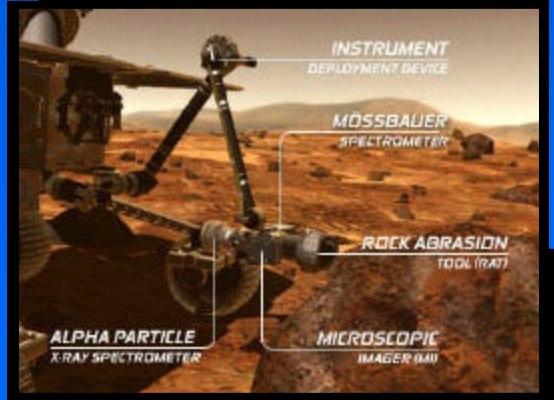
- *sediment fans*
- *materials from most ancient highlands*



## Surface materials




## Mission Science




- *rocky debris mixed with fine-grained material*
- *layered deposits*

- *diverse mineralogy including likely water-altered (weathered) materials*